

## ORGANIZATION AND HAZARDS OF OCCUPATIONAL DISEASES AMONG WOMEN IN TEXTILE CRAFTS IN THE CITY OF OUAGADOUGOU

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### ABSTRACT

*The textile crafts indisputably contribute to socio-economical and cultural development of Burkina Faso, mainly with the loincloth hand weaving. Its organization has now become one of the political priorities of governments and their partners of development. The aim of this study was to analyze the organization and health hazards of women who weave loincloths in Ouagadougou city. It is a qualitative study that carried out from March to September 2018 in Ouagadougou. Interview survey and clinical examination were used to collect data from 103 subjects. The content analysis was carried out for data processing. It was found that the unit of family production and association grouping are the main forms of organization of the handcrafted loincloths weaving. Technical and technological processes have not changed much and the family unit remains the base of production. It also showed that the hand weaver worked alone throughout the process from dyeing to fabric. She is exposed to chemical hazards and physical loads resulting in the development of occupational diseases such as skin problems and musculoskeletal and respiratory disorders. The results suggest that the introduction of safety and health in the next actions of governments and its partners in textile crafts field. They also recommend prevention mechanisms based on bio-mechanical and psychological ergonomics analyses.*

**KEYWORDS:** Textile Crafts, Occupational Hazards, Informal Sector, Musculoskeletal Disorders & Burkina Faso

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### INTRODUCTION

The Gross Domestic Product (GDP) contribution of Informal sector work is more than 50% in low-income countries. It represents almost 80% of non-agricultural employment, over 60% of urban employment and more than 90% of new jobs in Africa (Igué, 2003; Raymond & Kalilou, 2008). In this sector, handcrafted textile processing is identified as a promising economic sector in Burkina Faso. Despite technical and technological advances, small-scale weaving has adapted to the societies modernization in the continents, particularly in Asia and Africa (Adanur, 2000; Hashino & Otsuka, 2013; Motamedzade, Choobineh, Mououdi, & Arghami, 2007; Raymond & Kalilou, 2008; Reddy, Galab, Dev, & Vinayan, 2008). Its role in the socio-economic development of Burkina Faso is a reality. Indeed, this profession of traditional woven loincloth known as "Faso Dan Fani" has now become almost reserved for women, who represent over 80% of the practicing (Igué, 2003).

Many studies have reported that weaving handcraft has a potential to diversify production (Boron et al., 2009; Damiba et al., 2007; Hashino & Otsuka, 2013). As a textile processing sector, its promotion is necessary for Burkina Faso, which is one of the leading cotton-producing countries with only 2% of production transformed at the local level

(Chambre de commerce et d'industrie du Burkina Faso, 2018). In this sense, efforts are done by the State of Burkina Faso and its partners to make an objective diagnosis of the sector difficulties and their solutions (Chambre de commerce et d'industrie du Burkina Faso, 2018). One of the last political decisions devoted an order to the promotion and development of the traditional "Faso Dan Fani" fabric. In this way, in each of the thirteen administrative regions of Burkina Faso a union of associations of hand weavers was created and affiliated to the National Federation of Hand weavers of Burkina Faso (FENATI/BF). It has about 40,000 women hand weavers for a total almost 50,000 members (Diarra, 2018). In addition, several reports show that actions have mainly focused on the difficulties weavers organization and their access to financial credits (Chambre de commerce et d'industrie du Burkina Faso, 2018; Diarra, 2018; Igué, 2003; Organisation des Nations Unies pour le développement industriel (ONUDI), 2006). Beyond improving the production, some authors consider the organization of workers such a form of intervention to prevent occupational diseases (Hashino & Otsuka, 2013; Stock et al., 2018). These last years, occupational diseases are considered by the International Labor Organization (ILO) to be an epidemic. According to this organization, it affects everyone and everywhere at workplaces and communities (Organisation internationale du Travail (OIT), 2013). The literature on health and safety of the workers in textile crafts in Burkina Faso is however almost non-existent. Hand weaving is known to be a physically demanding professional activity, with the postures and gestures it involve (Choobineh, Shahnava, & Lahmi, 2004; Nazari, Mahmoudi, Dianat, & Graveling, 2012). All these findings lead to questions about the possible connection of the various actions in textile crafts organization undertaken by the state and its partners on the health of stakeholders. The aim of this study is to analyze the organization and the occupational diseases hazards among traditional loincloth hand weavers in the city of Ouagadougou.

## **METHODOLOGICAL APPROACH**

This is a qualitative study carried out at the Biomechanics and Performance Laboratory of the Youth Institute of Physical Education and Sport in Porto Novo/ Abomey Calavi University in collaboration with the Public Health Department of Joseph KI-ZERBO University in Ouagadougou. The survey study carried out from March to September 2018 in the twelve (12) boroughs of the city and the clinical examination was carried out at the health center of the Institute of Sports Sciences and Human Development (ISSDH)/Joseph KI-ZERBO University. The city of Ouagadougou was chosen because the majority of hand weavers are living there with all forms of organization. A total of 103 female respondents took part in the study. The study protocol was approved by Burkina Faso's Ethics Committee for Health Research. It had two phases.

The awareness and consent phase of the workers, which consisted of meetings with the workers and their group leaders to explain the objectives and the interest of the study. After the study presentation, the weavers who agreed to participate proceeded to sign the consents. This phase allowed getting workers acceptance to the study.

The diagnostic phase aimed to obtain information on health problems in female hand weavers. This diagnosis was done using the survey at the weaving workplace and clinical examination. The combination of the clinical examination allowed the information obtained by the investigation to be confronted and objective.

The interview was done on individual basis and conducted in the weaving workplace using a semi-directive interview guide. It was used to collect from respondents, data on the organization of their weaving work and the health problems they face. Random method was used to select participants. Thus, the weavers who were met during the survey were interviewed. The number of participants was defined on the principle of theoretical saturation, meaning that the survey was suspended when there was no new discoveries (Pires, 2007; Savoie-zajc, 2007).

The clinical examination was performed by a physician assisted by a nurse, all specialized in occupational health care. An exchange session on the objectives of the study and expectations related to this part of the research has been previously organized. Seventy (70) randomly selected hand weavers based on their telephonic numbers directory were contacted to take part in the examination.

Data analysis consisted first of all of a transcript of the audio recordings made during the interviews. Then, manual codification and categorization of transcribed data helped determine the relationships between the different themes and concepts involved. About clinical examination, data was processed by synthesizing of the results from the consultation register.

## **RESULTS**

Of the one hundred and three (103) subjects who participated to the study, twenty-six (26) were interviewed and sixty-seven (67) responded to the clinical consultation. Their work experiences range from 05 to 15 (five to fifteen) years. Interview data analysis identified three categories of information: the forms of weaver's organization, the characteristics of weaving work, the health problems they are meeting and their prevention approaches. The analysis of data showed three forms of organizations of the weavers in the city of Ouagadougou. The first corresponds to the individual work; in this case, the weaver had her loom which she installed in the family courtyard. Usually they work with family members. After acquiring the yarn, they do the work alone, until the production process is completed. They are the most number in this way of working. The second form of organization is association or grouping. The largest number of these groups work under the same conditions as the previous ones, their work is done as a family.

The difference lies to the acquisition of the raw material, and the marketing of the product. The grouping was encouraged by both governments and its partners to facilitate their access to microcredit and markets. Groups or Associations are therefore guarantors of the raw material and market access (national and international). Members of these structures also benefit from training sessions, particularly in resource management and dyeing. The weaving centers constitute the third type of organization. Centers are production units created by some people that employ the weavers. They are in reduced number and like all micro-enterprise; the conditions of work of every center depends on the systems of management of the supervisor. Some of employed weavers are paid according to how much they work well and others have a monthly salary. The centers are generally well structured with manager of workshops, contrary to the two first forms of organization with a family workplace, not a really workshop. The other finding is that the type of equipment and the technical processes of weaving are the same. All the process is manual. The few attempts at mechanization failed for two reasons:

- due to the cost of these equipment;
- the cultural burdens that make mechanization products not well consumed at the local level.

Regarding the characteristics of weaving work, the results indicated that the complexity of the weaving activity leads to a much detrimental solicitation to the body. By analyzing the discourse of the hand weavers, the most quoted words are the multitude and variability of tasks, and the hardness of the weaving activity, which generate health hazards.

One of the respondents said: "my body cannot fail to suffer, because in my work we do everything. I breathe the dye in hot water, I am have to wake up early to walk for the yarn warping, and then I have to sit preparing bobbins for

shuttle before getting on the loom to weave. I realized that our work itself is not easy but as it is our livelihood, we are in it".

The verbatim were used to identify the main risk tasks of the weaving profession. This is dyeing, warping and weaving. In addition, the analysis of information on the health problems encountered by these workers allowed summarizing as: fatigue, sleep unrests, pain. In addition to the above issues, there were apprehensions such as the decrease of the breath and the vision. It also appears that sleep unrests are the result of their state of fatigue and the pain they feel in certain parts of the body. The sites of pain seem relatively accurate and the most common are the chest, lower back, and knees. Another aspect that has arisen is the disappearance of these pains when they return to work. The following account is illustrative: *"After all this work when go to bed, I suffer from pain, but the next day as soon as I restart work everything disappears"*.

About prevention, data analysis shows adaptations based mainly on the organization of work. In fact, expressions such as mutual aid and group work have been cited as solutions to reduce their work load. At the individual level, the task grouping is adopted by some of weavers. About dyeing, the physical protection of the hands and nostrils are evoked. Other apriori-based behaviors such as drinking milk after dyeing are widely adopted.

The clinical examination results revealed four additional essential information. These are:

The pathologies: medical visit shows that hand weavers have pathologies, the most recurrent of which are: musculoskeletal disorders, asthenia, headaches, epigastralgia, dyspnea, nocturnal photophobia, bloating and decreases in visual acuity. Regarding musculoskeletal disorders, the right side of the body appears to be most affected, especially in the shoulders, neck, back, and knees in addition to these areas other parts of the body, such as chest (ribs), pelvis and anus are that got affected.

The pain: the types of pain that emerge from these examination results are: myalgia, joint pain, especially the spine, cramps, radiating pain from the spine to the lower limbs.

The severity of the damage: it appears that the spine is the most affected and some have already been the subject of consultation for the most part. There is a case of surgery for herniated disc, cases of scoliotic deformity for most of the old ones. The knees and ankles are identified as painful, intensifying with activity, decreasing with rest. Of the 67 patients, 18 were referred to specialists.

## DISCUSSIONS

Recalling, the aim of the study was to identify health problems in the low scale textile industry of Women in the city of Ouagadougou. It is clear that the textile industry, whether artisanal or industrial, carries health risks (Choobineh et al., 2004; Siziya et al., 2013; Warshaw, Crompton, & Kay, 2019). Handcrafted weaving, since its beginning has been recognized as a manual art practiced either at home or by small teams of skilled craftsmen (Warshaw et al., 2019). According to the literature data and the results of our study, it looks like there has been little technological change in the practices of weavers. This technological conservatism can have mainly cultural and identity foundations. For some authors, the woven loincloth is a social phenomenon in its own right in African societies (Igué, 2003; Itagaki, 2013; Roy, 1982). Apart from its clothing function, it has a cultural value linked to both the economy and collective identity (Asakitikpi, 2007; Grossmann, 2003; Itagaki, 2013; Lefébure, 2010; Roy, 1982). Similarly, writings show that the weaving style of

these loincloths is specific to each area, which they believe has contributed to the development of local group identities (Asakitikpi, 2007; Grossmann, 2003; Igué, 2003; Lefébure, 2010; Roy, 1982). Changing technology would mean changing the texture and eventually the type of woven loincloths, and it would not meet the needs of the local population. That could be justified since production is much more for local consumption.

However, it should be noted that the loom used now by weavers is an adaptation or an evolution of that traditional practice, which was reserved for men (Fortin, 2019). Before 1959, women exclusively used the Yoruba-type vertical loom, which mainly mobilizes the back and arm muscles and runs very slowly (Fortin, 2019; Grosfilley, 2006). Like the horizontal loom with a framework and suspended pedals, that has double productivity, Religious sisters had the idea to design, a horizontal loom for women that is faster and more ergonomics as the vertical one (Fortin, 2019). The author explains this evolution in these terms (Fortin, 2019):

They use carpenters to make a wooden loom inspired by the men's one, but allowing them to weave in a sitting position on a stool and no longer on the ground, which is tiring. After several experiments, they also added a wooden drum on the other side of the loom, used to wrap the chain on top and weave in a small space. However, this improved loom, which was built first in wood and then in metal, is more expensive than the simple and cheap Yoruba wood loom (Fortin, 2019, p.13).

This kind of technological conservation supports the fact that despite the efforts of the weavers to organize, their activity has remained informal. It has the characteristics of an informal activity like ILO defined. It is independent activity, carried out with a low level of organization and technology, and with a main objective of creating income for them (BIT, 2003; Gherbi, 2014). Most of hand weavers are out of the administrative mechanisms responsible for enforcing safety and health, tax and minimum wage legislation and other similar instruments concerning and working conditions, they are dissimulated; Referring to ILO, it is really informal (BIT, 2003; Gherbi, 2014).

In the end, the results of the study confirm the rudimentary nature of the textile craft practiced in the city of Ouagadougou. Indeed, the data collected shows that all the work is manual and it engages the weaver from the beginning of the process to the end, that is to say, from dyeing to fabric. This probably increases the illness hazards and work-related accidents.

About it, dyeing was found to be the first operation of the hand-crafted weaving process. Dyeing is a chemical combination between a dye and a textile fiber. It is a chemical reaction between a dye particle and the textile fiber in a watery environment in high temperature (Drumond Chequer et al., 2013; Salles, 2000). It is an operation in three main steps, which are:

The preparation step: it consists of cleaning the impurities of the yarn before dyeing. It is usually done with watery alkaline substances and detergents or by the application of enzymes (Drumond Chequer et al., 2013; Warshaw et al., 2019);

The dyeing step: that is the application of color to textile substrates in watery environments by the use of synthetic organic dyes and frequently at high temperatures or in other conditions (Drumond Chequer et al., 2013; Warshaw et al., 2019);

The finishing step: it is the treatment of yarn dyed by fixers or other products aimed at improving the quality of the fabric (Drumond Chequer et al., 2013; Warshaw et al., 2019).

Dyeing is, in fact, a professional activity with its requirements (Salles, 2000). However, it is considered as a step in the weaving process by the respondents since most of them are involved in dyes and weaves. The health hazards associated with dyeing are diverse. In addition to the risks associated with chemicals and heat, it is an activity that physically engages the weavers. With negligence and lack of knowledge about methods of protection, chemicals can lead to irritation of the eyes and skin and, above all, of the lungs, causing edemas, in some cases, whose symptoms do not appear immediately (Kitronza, 2014; Motamedzade et al., 2007; Warshaw et al., 2019). Epigastralgiias, dyspnea, nocturnal photophobia, bloating and visual acuity decreases diagnosed during medical examination are possibly the consequences of exposure to dyeing.

The major manual operation with a physical load after dyeing is weaving. The weaving activity is a series of know-how and techniques that clearly present a set of physical loads detrimental to the musculoskeletal system (Motamedzade, Afshari, & Soltanian, 2014; Nazari et al., 2012; Pandit, Kumar, & Chakrabarti, 2013; Pradesh & Tanusree, 2015). These findings were also done by Nazari et al., (2012) who have worked on the working conditions of carpet weaving. They claim that weaving activity generates hard tasks that can lead to the development of musculoskeletal disorders (MSDs). The same observation is made by Choobineh, Hosseini, Lahmi, KhaniJazani, & Shahnava, (2007), who conclude that weaving is a profession at high risk of musculoskeletal disorders.

These musculoskeletal risks related mainly to physical load, are associated with the risk of respiratory problems by inhaling cotton dust (Warshaw et al., 2019). There are also the risks associated with prolonged exposure of the eyes related to the colors of the yarn chain, or the weft (Warshaw et al., 2019).

## **LIMITS OF THE STUDY**

Psycho-social factors are also recognized to have an effect on the risk of occupational diseases. However, it has emerged that they are at the center of their activity, both physically and mentally. Considering the economic and social realities of these women in textiles craft, it appears that the major limitation of the study is the lack of the psycho-social aspect with parameters such as work stress.

## **CONCLUSIONS**

In general, there is a lack of scientific data on health and safety in the informal sector and particularly in textile craft in developing countries. However, this sector contributes significantly to the economies of these countries, hence the need for better organization of the sector. In this connection, the aim of this study was to analyze the occupational diseases hazards related to textiles craft dominated by women in the city of Ouagadougou.

The results showed that the technology used in the profession remained primitive. Similarly, the organization of the sector places mainly small family units as production bases; placing the weavers at the center of the whole process. The consequences are pathologies whose main ones are musculoskeletal disorders, visual and respiratory disorders.

These results call for further ergonomic studies to analyze the situation of weaving work in order to prevent these pathologies. They also recommend that the issue of health and safety be combined in actions with those involved in textile crafts.

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### **Publications 2, Communications 1**



**Brigitte NANA : Full-time teacher**, Department of Exercise and Sport Sciences, Institute of Sport Sciences and Human Development (ISSDH) / Joseph Ki- ZERBO University (UJKZ), Ouagadougou, BURKINA FASO

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#### **Publications 2, Communications 1**



#### **Pr. Mohamed Mansourou LAWANI ; PhD,**

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Member of International Society of Biomechanics (ISB) – USA, Association des Chercheurs en Activités Physiques et Sportives (ACAPS).

#### **Publications**

More than 70 publications and 80 communications; some of them are:



**Ahmed KABORE:** Assistant Professor of public health since 2017 at the Institute of Sports and Human Development (ISSDH)/ Joseph Ki- ZERBO University (UJKZ), Ouagadougou, BURKINA FASO

DrPH in Community Health Behavior & Education / Georgia Southern University Jiann-Ping Hsu College of Public Health Statesboro, GA January 2016

M.P.H., Epidemiology / Georgia Southern University Jiann-Ping Hsu College of Public Health Statesboro, GA May 2013 B.S., Community Health /Georgia Southern University Statesboro, GA May 2011 Associate Degree, Surgical Technology/Savannah Technical College / Savannah, GA September 2008

### **Publications 3**

#### **Book Chapters**

Büscher, A., & Kabore, A. (2014). Development of quality indicators based on expert standards. In Schiemann, D., Moers, M., & Büscher, A. (ed.): Quality Development in Nursing. Concepts, methods and instruments. Stuttgart: Kohlhammer, 191-201.



**Vignon Sèglagratièn HOUETO**, Assistant Professor at the National Institute of Youth in Physical Education and Sport (INJEPS), Porto-Novo, University of Abomey Calavi (UAC) Benin.

#### **EDUCATIONNAL DETAILS:**

PhD in Science and Technology of Physical and Sports Activities, Biomechanics and Performance Research Unit (URBioP) at the National Institute of Youth in Physical Education and Sport (INJEPS), Porto-Novo, University of Abomey Calavi (UAC) Benin.

### **Publications 2, Communications 4**

